

481

Rezoning of land from Urban Deferred to Urban, Egerton (adjacent to Ellenbrook)

Multiplex Constructions Pty Ltd

**Report and recommendations
of the Environmental Protection Authority**

**Environmental Protection Authority
Perth, Western Australia
Bulletin 743
June 1994**

THE PURPOSE OF THIS REPORT

This report contains the Environmental Protection Authority's environmental assessment and recommendations to the Minister for the Environment on the environmental acceptability of the proposal.

Immediately following the release of the report there is a 14-day period when anyone may appeal to the Minister against the Environmental Protection Authority's report.

After the appeal period, and determination of any appeals, the Minister consults with the other relevant ministers and agencies and then issues his decision about whether the proposal may or may not proceed. The Minister also announces the legally binding environmental conditions which might apply to any approval.

APPEALS

If you disagree with any of the contents of the assessment report or recommendations you may appeal in writing to the Minister for the Environment outlining the environmental reasons for your concern and enclosing the appeal fee of \$10.

It is important that you clearly indicate the part of the report you disagree with and the reasons for your concern so that the grounds of your appeal can be properly considered by the Minister for the Environment.

ADDRESS

Hon Minister for the Environment
12th Floor, Dumas House
2 Havelock Street
WEST PERTH WA 6005

CLOSING DATE

Your appeal (with the \$10 fee) must reach the Minister's office no later than 5.00 pm on 14.7.94.

Environmental Impact Assessment (EIA) Process Timelines in weeks

Date	Timeline commences from receipt of full details of proposal by proponent	Time (weeks)
14/2/94	Proponent Document Released for Public Comment	4
14/3/94	Public Comment Period Closed	
28/3/94	Issues Raised During Public Comment Period Summarised by EPA and Forwarded to the Proponent	2
15/4/94	Proponent response to the issues raised received	2.5
30/6/94	EPA reported to the Minister for the Environment	11

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DEPARTMENT OF THE ENVIRONMENT

**ERRATA - ENVIRONMENTAL PROTECTION AUTHORITY
BULLETIN 743 - REZONING OF LAND FROM URBAN
DEFERRED TO URBAN, EGERTON (ADJACENT TO
ELLENBROOK)**

Please note that the timing indicated for preparation of strategies for the Southern Brown Bandicoot and Western Swamp Tortoise in Recommendations 4 and 5 is incorrect. The recommendation for timing is correctly stated in the Recommended Environmental Conditions 4-3 and 4-5, which state that the strategies should be prepared prior to the adoption of the structure plan required by the Shire of Swan Town Planning Scheme

The Department apologises for any inconvenience

1 July 1994

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Summary and recommendations

Multiplex Constructions Pty Ltd are proposing a major residential development intended to provide some 3,650 residential lots on 495 ha of land located at Egerton, about 20km from Perth in the North East Corridor.

The proposal to rezone the land from Urban Deferred to Urban was referred to the Environmental Protection Authority in September 1993. In view of the environmental issues which could arise from implementing urban development of the subject land and issues raised during environmental impact assessment of the adjacent land, a Consultative Environmental Review level of assessment was set.

Twelve submissions were received during the public review period. The principle issues of concern were hydrological issues including drainage and groundwater, flora, fauna and habitat concerns, social issues/public consultation, environmental implications and management, and public open space areas.

The Environmental Protection Authority has considered this proposal in the context of its policy framework for urban conservation and wetlands, the Consultative Environmental Review document, submissions from the public and government agencies, and the proponents response to submissions.

Recommendation 1

The Environmental Protection Authority has concluded that the proposal to rezone the subject land referred to in this report from Urban Deferred to Urban in the Metropolitan Region Scheme, as modified during the assessment process, is environmentally acceptable.

In reaching this conclusion the Environmental Protection Authority identified the major environmental issues as:

- (i) water quantity and water quality management for protection of the wetlands, Ellen Brook, the Swan River and adjoining land;
- (ii) protection of flora and fauna (ie urban conservation and wetland protection), including;
 - the potential impact to endangered fauna, particularly the Southern Brown Bandicoot (*Isodon obesulus*) and the possible presence of the critically endangered Western Swamp Tortoise (*Pseudemydura umbrina*);
 - retention of the functions of Swan Coastal Plain wetlands which may be affected by this proposal; and
- (iii) proper management of (ii) above.

Accordingly, the Environmental Protection Authority recommends that the proposal could proceed subject to the proponent's environmental commitments listed in Appendix 1 and the following recommendations and Recommended Environmental Conditions.

Water quality and quantity

Implementation of urban development on the subject land would most likely change groundwater levels, surface drainage characteristics and the quality of the both the surface and ground water.

Whilst several water quality parameters would change as a result of urban development, nutrients levels (particularly phosphorus and nitrogen) are of most concern. Continued discharges of phosphorus rich run-off from Ellen Brook and similar catchments may cause a

shift in Swan River phytoplankton communities toward seasonal dominance by blue-green species, and possibly result in problems similar to those being experienced in the Peel-Harvey estuary, or the Murray-Darling river system in the eastern states (Swan River Trust 1993a). Similar problems could potentially also be experienced in wetlands on the subject land.

Changes in groundwater levels are likely because of changes to drainage, an increase in impervious surfaces (e.g. roads and roofs), changes to evapotranspiration water loss due to loss/increase in tree cover and from the importation of scheme water to the area. Changes in groundwater levels either up or down could have an impact upon;

- the conservation values of wetland systems because survival of some wetland vegetation associations is dependent on the water level regime (Froend, et al. 1993);
- the amount of water available for abstraction; and
- adjoining land uses (e.g. from flooding/ death of groundwater dependent vegetation).

The proponent has provided a commitment to develop a Drainage Management Plan. However, few details have been provided regarding the scope of the plan.

The timing of implementation for this and the following recommendations has been discussed with the Shire of Swan.

Recommendation 2

The Environmental Protection Authority recommends that, prior to lifting of "Urban Deferred" to "Urban" in the Metropolitan Region Scheme, the proponent should establish environmental criteria and objectives for:

- (i) water quality parameters for the minimisation of nutrient export to Ellen Brook and the Swan River (loads as well as concentrations); and**
- (ii) water level and water quality criteria which will ensure the maintenance of wetland function, and protect adjoining land uses.**

The fulfilment of (i) & (ii) above should be to the requirements of the Minister for the Environment on advice from the Environmental Protection Authority, the Water Authority of Western Australia, the Swan River Trust and the Shire of Swan.

Recommendation 3

The Environmental Protection Authority recommends that, prior to adoption of the structure plan required by the Shire of Swan Town Planning Scheme, the proponent should prepare a detailed Environmental Management Program (EMP) for nutrient and drainage management which complies with the environmental criteria and objectives established by Recommendation 2 and which includes the development of a comprehensive monitoring, management and reporting program, to meet the requirements of the Minister for the Environment on advice of the Environmental Protection Authority, the Water Authority of Western Australia, the Swan River Trust and the Shire of Swan.

The EMP should be implemented to meet the requirements of the Environmental Protection Authority on advice from the Water Authority of Western Australia, the Swan River Trust and the Shire of Swan.

Remnant vegetation and the 'Mound Spring'

The Environmental Protection Authority's approach in this assessment to the issue the remnant vegetation, including that of the 'mound spring', is in accordance with the Environmental

Protection Authority Urban Conservation strategy, which appears in the main section of this report. The assessment based on that strategy concluded that, apart from the remnant vegetation associated with wetlands, the protection of remnant vegetation (including the 'mound spring') on the property should be considered by the planning agencies, with advice from the Environmental Protection Authority.

That advice is contained in this report and, in summary, is as follows:

- retention of native vegetation within Public Open Space for conservation is supported; and
- the concept that vegetated linkages be retained between wetlands and areas of habitat to provide for exchange of genetic resources, adequate dryland habitat for fauna and refuges in case of a major disturbance (e.g. fire) is supported. This concept should be used as a basis for planning Public Open Space for conservation.

Irrespective of whether or not the wet area in the north west of the Egerton land is a true 'Mound spring' or as stated in the Consultative Environmental Review a water seepage area, the proponent has indicated an intention to incorporate the area and any flora or fauna associated with the wetland area within Public Open Space for the main purpose of conservation. The proponent has also indicated that management plans would be prepared for Public Open Space areas and that the Drainage Management Plan would ensure that seepage continues. Recommendation 4 below also relates to the seepage area.

Wetlands

The Environmental Protection Authority's approach to the issue the wetlands in this assessment is in accordance with Environmental Protection Authority Bulletins 685 and 686, a summary of which appears in the main section of this report. There are no wetlands affected by the Environmental Protection (Swan Coastal Plain Lakes) Policy Approval Order 1992 at Egerton. Consistent with the approach outlined in Bulletins 685 and 686, the broad management objectives for wetlands at Egerton have been determined.

The wetland classification system of Semenuik, 1988 categorises wetlands at Egerton as creeks, sumplands and palusplain.

The creeks are to be modified for drainage purposes, but would substantially remain in their present state and alignment.

The broad management objectives (using EPA Bulletin 686) for the palusplain wetlands has been determined as Multiple Use. The Environmental Protection Authority agrees with the proponents assessment that filling of most of these areas for development would not have important environmental implications.

Investigations by the proponent (using EPA Bulletin 686) found that "...the sumplands remain in the Resource Enhancement category in terms of their general attributes but some can also be included in the High Conservation Category as a result of the presence of a rare and endangered species, the Southern Brown Bandicoot (*Isoodon obesulus*)" (Allan Tingay & Associates 1994b).

Given the environmental importance of wetlands on the Swan Coastal Plain and the above information, the Environmental Protection Authority considers that future planning of Egerton should ensure important wetland areas are adequately identified, protected and managed. Particular attention needs to be directed towards identifying and protecting wetland functions (as recommended in Bulletin 686) and to providing adequate buffers to the wetlands.

Recommendation 4

The Environmental Protection Authority recommends that prior to adoption of the structure plan required by the Shire of Swan Town Planning Scheme, the proponent prepare and subsequently implement a strategy for the management

of the wetlands on the site which includes but is not limited to consideration of the following:

- the boundary of the Public Open Space having regard for wetland conservation and the associated need for a 'dryland buffer';
- wetland function(s) should be defined; and
- the management requirements necessary to protect wetland function(s) and the agency responsible for on-going management and monitoring should be identified.

to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority and Shire of Swan.

Dryland buffers around wetlands provide important functions which include;

- separating water habitats from human activities on surrounding land;
- providing complementary habitats for fauna (e.g. Bandicoots, waterbirds) using the waterbody; and
- trapping nutrients and sediments entering a waterbody.

Where wetland buffers are degraded they can be rehabilitated or enhanced.

Fauna

In general, the above recommendations and commitments by the proponent would ensure adequate protection of fauna found on the site. However, there are two species of fauna which warrant consideration by the Environmental Protection Authority.

The Southern Brown Bandicoot (*Isoodon obesulus*) occurs on the site and is listed on Schedule 1 (species which are likely to become extinct or rare) of the Wildlife Conservation Act. The proponent has made a commitment to seek advice from the Minister for the Environment on the preferred method for management of the Southern Brown Bandicoot population and prepare and implement a strategy based on that advice to the satisfaction of the Minister prior to development (see commitment 5.3 Appendix 1).

The Department of Conservation and Land Management have recommended that the resident Southern Brown Bandicoot population be monitored and managed on site. The Department also indicated that "...it is important that both core habitat areas and some winter (dry) refuge areas are retained (for example, the north-west woodland area)." (Department of Conservation and Land Management, 16 March 1994). Recommendation 5 reflects the Department of Conservation and Land Management's advice.

Concerns were raised that the Western Swamp Tortoise (*Pseudemydura umbrina*), which is also protected under the Wildlife Conservation Act, may occur in areas on the subject land with similar habitat to the nearby Twin Swamps and Ellen Brook reserves. Although it is considered unlikely to occur on the subject land, the Environmental Protection Authority considers that the importance of this species warrants a detailed survey and that appropriate management should be implemented if the Tortoise is found. Recommendation 6 reflects this view.

Recommendation 5

The Environmental Protection Authority recommends that prior to rezoning in the local authority Town Planning Scheme, Multiplex Constructions Pty Ltd prepare and subsequently implement a strategy for the protection of the Southern Brown Bandicoot (*Isoodon obesulus*) population to the requirements of the Environmental Protection Authority on advice from the Department of Conservation and Land Management.

Recommendation 6

The Environmental Protection Authority recommends that prior to rezoning in the local authority Town Planning Scheme, Multiplex Constructions Pty Ltd undertake a detailed survey for the Western Swamp Tortoise (*Pseudemydura umbrina*) and subsequently implement an approved strategy for this species, to the requirements of the Environmental Protection Authority on advice from the Department of Conservation and Land Management.

Other issues

As indicated in its assessment of the adjoining Ellenbrook proposal (EPA Bulletin 642), the Environmental Protection Authority considers that the establishment of the Water Authority's Lexia Groundwater Scheme, including the reservoir and treatment plant would require separate environmental impact assessment to ensure potential environmental impacts associated with groundwater abstraction and siting of these facilities, such as wetland protection, remnant vegetation protection, habitat protection and ecosystem protection are considered. Preparation of the environmental review is the responsibility of the Water Authority of Western Australia and should be completed prior to commencement of the Scheme.

Full details associated with the location and operation of sewerage treatment works and infrastructure is not provided in the Consultative Environmental Review document. Nevertheless, in view of the proximity of the subject land to Ellen Brook which flows into the Swan River, groundwater and drainage considerations and the complex hydrology of the area, the Environmental Protection Authority considers that the establishment of on-site effluent disposal facilities, if proposed, will require separate environmental assessment at the appropriate time.

1. Introduction

The owners of the Egerton property, Multiplex Constructions Pty Ltd, are proposing a major residential development intended to make provision for some 3,650 residential lots with a projected maximum population of 11,800 people.

The Egerton property is located approximately 20km north of Perth in the Shire of Swan (Figure 1). The property is to the south-west of the Vines Resort and is immediately adjacent to, and east of, the proposed Ellenbrook Residential Estate. This land is part of a larger property owned by Multiplex Constructions Pty Ltd which is also known as Egerton (Allan Tingay & Associates 1994a).

The subject land is currently zoned Urban Deferred in the Metropolitan Region Scheme and comprises Lots 148, 30 and 2 with a total area of 495.3540 hectares. Multiplex Constructions Pty Ltd have initiated the necessary steps through the planning process for the removal of the Urban Deferred status over their land so that the property would be available for urban development. The Consultative Environmental Review (CER) describes a Structure Plan for an urban estate on the Egerton property which the proponent considers responds to the specific opportunities and constraints presented by the existing features of the site (Allan Tingay & Associates 1994a).

The proponent for the Consultative Environmental Review is Multiplex Constructions Pty Ltd.

The subject land is located on the easternmost fringe of the Gnangara Mound and is adjacent to the Ellen Brook watercourse which flows into the Swan River. The land comprises extensive areas of palusplain containing a number of small ephemeral watercourses and also contains other wetlands. Submissions to the Public Environmental Review for the adjacent Ellenbrook proposal (refer to Environmental Protection Authority Bulletin 642) also indicated the presence of an environmentally significant Mound Spring in the north west corner of the land owned by Multiplex Constructions Pty Ltd.

Please note that the structure plan shown in the Consultative Environmental Review document has not been assessed in this report. However, guidance for a future structure plan, which is expected to be required by the Shire of Swan in accordance with proposed amendments to the Shire's Town Planning Scheme, is included within the body of this report.

2. Background

The timing of environmental assessment of the Urban Deferred land at Egerton has been influenced by the Environmental Protection Authority's formal assessment of land adjoining Egerton owned by Sanwa Vines Pty Ltd and Homewest. This adjoining land was subject to a Public Environmental Review and was assessed by the Environmental Protection Authority in Bulletin 642, August 1992. It was referred to as the Ellenbrook urban rezoning, subdivision and development proposal.

At the time of initial referral of the Ellenbrook project to the Environmental Protection Authority Mt Lawley Pty Ltd, Multiplex Pty Ltd, Sanwa Vines Pty Ltd and Homewest owned land within the area proposed by the State Planning Commission to be rezoned from existing Rural to Urban Deferred within the Metropolitan Region Scheme.

However, of the four private landholders only Mt Lawley Pty Ltd, Sanwa Vines Pty Ltd and Homewest were nominated proponents in the Public Environmental Review for the Ellenbrook proposal. Multiplex Constructions Pty Ltd withdrew from the environmental assessment process prior to the preparation of the Public Environmental Review document. Following release of Bulletin 642 on 14 August 1992, Mt Lawley Pty Ltd requested that it be withdrawn as a proponent. This was agreed to and the Minister for the Environment revoked its nomination as a proponent under Section 38(7) of the Environmental Protection Act. The

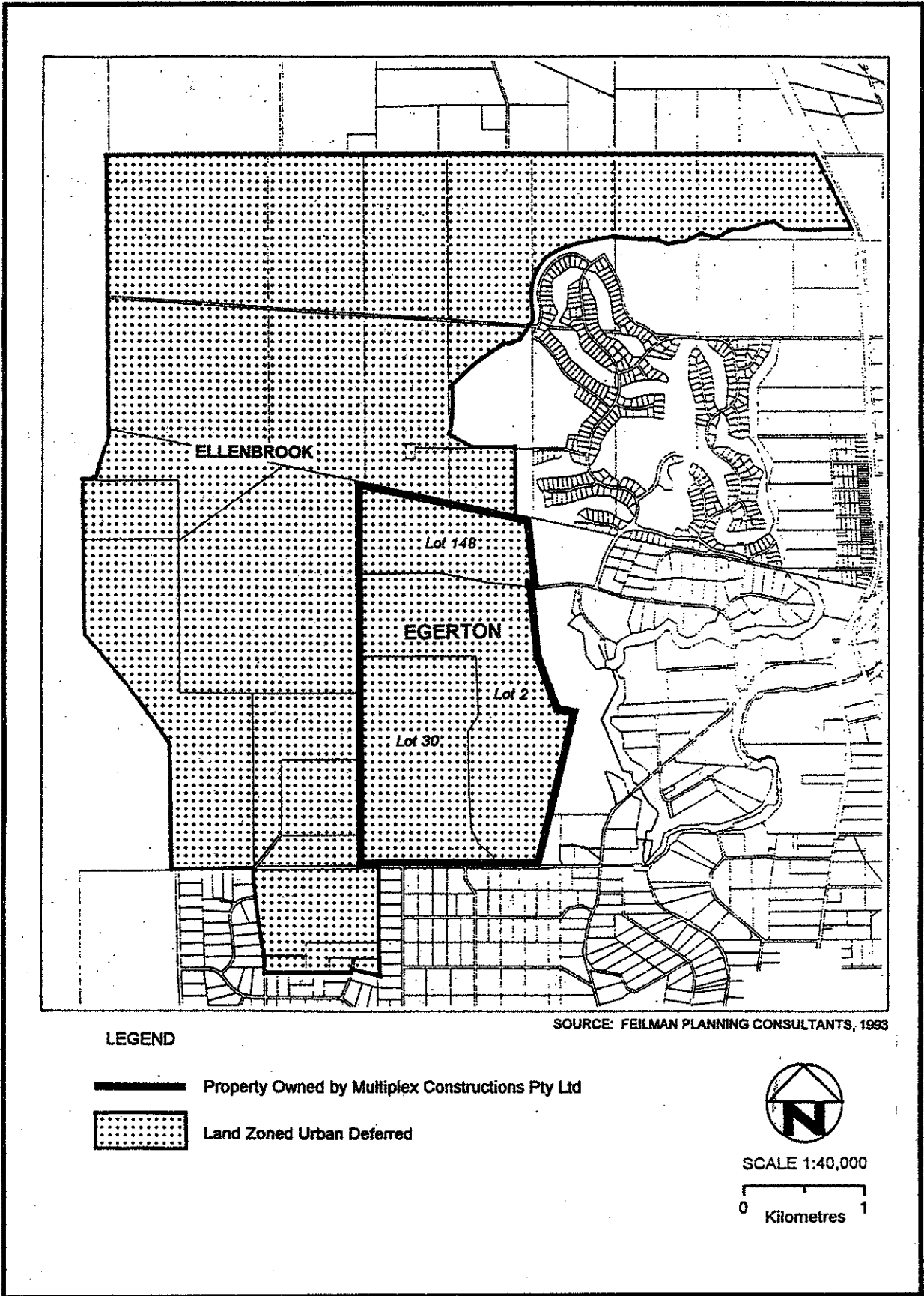


Figure 1. Map showing the subject land, known as Egerton. (Source Figure 3 of the Consultative Environmental Review)

remaining proponents, Sanwa Vines Pty and Homewest, have now formed a joint venture, Ellenbrook Management Pty Ltd, to co-ordinate the Ellenbrook project and develop and market the Ellenbrook land.

Although not a proponent in the Public Environmental Review, Multiplex were still included within the State Planning Commission's proposed amendment to the Metropolitan Region Scheme, and subsequently a portion of the Egerton land was rezoned from Rural to Urban Deferred.

As a result, the Environmental Protection Authority indicated in its Report and Recommendations to the Minister for the Environment (Environmental Protection Authority 1992a), that the environmental issues associated with proposed urban development on the Multiplex land would require separate assessment prior to the lifting of Urban Deferred zoning to Urban.

This report meets that requirement.

3. Planning context

Planning in the Perth Metropolitan Region occurs under the Metropolitan Region Scheme Act and the Town Planning and Development Act. The State Planning Commission and Department of Planning and Urban Development are bodies created under these acts to identify long-term regional planning needs for the Perth Metropolitan Region.

Metroplan is the most recent metropolitan strategy for the Perth Region. It is a government statement about the direction development of Perth will take into the next century. Metroplan is supported by a series of strategic policy statements on particular topics as well as Structure Plans for urban growth areas. The Metropolitan Region Scheme together with the policy framework provided by Metroplan are the instruments for implementing regional land use policy.

Egerton is located within the North East Corridor. Metroplan, and the Urban Expansion Policy Statement released by the Department of Planning and Urban Development in 1990, identify the proposed North East Corridor as one of the major initiatives which will be necessary to satisfy the current and future demand for residential land within the Perth metropolitan area. Consequently, the Department of Planning and Urban Development have recently prepared a Structure Plan for the North East Corridor and have also initiated a major amendment to the Metropolitan Region Scheme (No.950/33), based on the North East Corridor Structure Plan.

The Environmental Protection Authority will provide informal advice to the State Planning Commission on environmental issues associated with the North East Corridor Structure Plan and Amendment No.950/33. The Environmental Protection Authority's informal advice on these proposals will be made available to the public.

A proposal for the Perth - Darwin National Highway and excision of part of State Forest No 65 for urban development is also currently being assessed by the Environmental Protection Authority at the level of Public Environmental Review. The proponents for the Public Environmental Review are Main Roads and Ellenbrook Management Pty Ltd. This proposal does not directly affect the land at Egerton, but may have regional transport implications.

The Egerton land is currently zoned Urban Deferred under the Metropolitan Region Scheme. The Urban Deferred zone applies to land which is physically and locationally suitable for urban development, but which requires comprehensive planning before it can be included in the Urban zone.

The next step in the planning process involves rezoning the land from Urban Deferred to Urban under the Metropolitan Region Scheme and to Residential Development or a similar zoning under the Shire of Swan's Town Planning Scheme. The residential development for Egerton will be guided by a specific Structure Plan developed by the proponent in response to the opportunities and constraints of the site. A Structure Plan is included in the Consultative Environmental Review.

In view of the proximity of the area to the Ellen Brook watercourse, the potential 'Mound Spring' site and other environmental issues of concern, the Environmental Protection Authority considers that it is highly desirable for decisions made by the planning process on future zoning of this land to be made within the context of the environmental assessment provided by the Consultative Environmental Review process.

4. Submissions received

Comments were sought on the proposal from the public, community groups and local and State Government Authorities. The proponent's Consultative Environmental Review document was available for public comment for a period of four weeks between 14 February 1994 and 14 March 1994.

There were 12 submissions received, within the following categories:

- 5 individual letter submissions;
- 5 submissions from groups and organisations; and
- 2 submissions from state government agencies.

The principle issues of concern in the submission include:

- hydrological issues;
- flora, fauna and habitat concerns;
- social issues;
- environmental implications and management;
- public open space areas; and
- other general issues.

The Environmental Protection Authority's summarised list of issues raised through the public review phase and the proponents response to those issues are included as Appendix 2 in this report.

The Environmental Protection Authority has included consideration of the submissions received and the proponents response as part of the assessment of the Egerton proposal.

Concerns raised over archaeology, ethnology and transport planning and management are the responsibility of other agencies and cannot be considered in this report. They should be considered by other decision makers for the project.

5. Environmental assessment - Policy framework

5.1 Urban conservation strategy

The Environmental Protection Authority's strategy for urban conservation has been established through the Conservation Through Reserves study undertaken by the Conservation Through Reserves Committee (EPA 1975, 1976, 1980 and 1983) which are endorsed by Government and through three environmental impact assessments of proposed developments over land with high conservation value which had not been recommended for conservation by the study (Ellenbrook (Environmental Protection Authority 1992a) and Brixton Street September 1991 (Environmental Protection Authority 1991) and July 1992 (Environmental Protection Authority 1992b)).

The Conservation Through Reserves study divided the State into 12 regions or Systems. System Six or the Darling System extends from Moore River in the North to Bunbury in the South, extending inland up to about 45km. System 6 covers the populated areas in and around Perth where there are often competing land uses.

The Environmental Protection Authority's strategy for urban conservation includes the following elements:

- an adequate and representative system of reserves should be set aside for the conservation of flora, fauna and landscape;
- such reserves should be properly managed and given security of tenure which recognises their conservation value;
- the integrity of such reserves should be maintained;
- the System Six Report (endorsed by Government in 1983) established through the Conservation Through Reserves studies has formed a principle focus for the Environmental Protection Authority's conservation efforts on the Swan Coastal Plain;
- decisions to look at areas outside the Systems' areas are the exception but any proposal which may impact on areas of high conservation value outside the Systems areas should be looked at carefully and referred to the Environmental Protection Authority to be considered for environmental impact assessment. Areas with regionally significant vegetative systems which are endangered may be recommended for protection. Examples of areas which have been assessed by the Environmental Protection Authority and have been found to have regionally significant conservation value which should be protected have been noted above. General criteria for determining regionally significant conservation value include:
 - the regional vegetation complex is endangered (ie. in general less than 10% of the vegetation complex remains and less than 10% is secured for conservation);
 - the area should have a unique attribute or special feature such as diversity of plant and animal communities, habitat for species that are scarce or otherwise threatened and in need of protection, contain elements that have scientific and educational value and have a high degree of naturalness;
 - the area should have a high degree of representativeness; and
 - the area should be managed to ensure viability.
- decisions on managing impacts on individual species which are endangered have generally been the responsibility of the Department of Conservation and Land Management under the Wildlife Conservation Act and the advice of that Department should be sought if species gazetted under the Wildlife Conservation Act may be present. The Department of Conservation and Land Management may refer proposals to the Environmental Protection Authority for assessment; and
- decisions on protecting areas of remnant vegetation outside the above framework for local conservation, linkages, buffers or local community use should be the responsibility of the planning agencies which have the framework to accommodate community interests in protecting the land for local conservation and recreation and to take into account the costs associated with this such as acquisition and the reduction of land for housing and other development.

In adopting this strategy, it is not intended to diminish the importance of the issues associated with local areas which do not have high conservation value or to discourage community concerns, but rather to indicate the role of the planning process in making decisions regarding the use of the land.

5.2 Wetland protection

Since 1971, the Environmental Protection Authority has consistently recognised the need to conserve lakes and wetlands and has developed a strategy for wetland protection on the Swan Coastal Plain (Environmental Protection Authority 1993, Bulletin 685).

The Environmental Protection Authority discourages proposals which would affect significantly functional lakes and wetlands, that is:

- Lakes nominated for protection in the Environmental Protection (Swan Coastal Plain Lakes) Policy Approval Order 1992;
- representative wetlands recommended for protection in the Environmental Protection Authority's System Six report;
- wetlands with rare vegetation communities not adequately represented in reserves, or rare flora and fauna (and their habitats); and
- wetland recognised by international agreement because of their importance primarily for waterbirds and their habitats.

Any proposals affecting wetlands which do not fall into the above categories are expected to be managed by the proponent within the management objectives for the relevant category of wetland identified in the Environmental Protection Authority's Bulletin 686 '*A Guide to Wetland Management in the Perth and near Perth Swan Coastal Plain Area*'.

The main factors to take into account in protecting these wetlands include:

- assessment and management of the wetlands having regard to the Environmental Protection Authority's guidance contained in bulletin 686; and
- protection of water levels and water quality through management of drainage.

6. Environmental assessment

Following consideration of the Consultative Environmental Review, submissions from the public and government agencies the proponents response to submissions and other advice, the Environmental Protection Authority has concluded that the proposal as described is environmentally acceptable.

Recommendation 1

The Environmental Protection Authority has concluded that the proposal to rezone the subject land referred to in this report from Urban Deferred to Urban in the Metropolitan Region Scheme, as modified during the assessment process, is environmentally acceptable.

In reaching this conclusion the Environmental Protection Authority identified the major environmental issues as:

- (i) water quantity and water quality management for protection of the wetlands, Ellen Brook, the Swan River and adjoining land;**
- (ii) protection of flora and fauna (ie urban conservation and wetland protection), including:**
 - **the potential impact to endangered fauna, particularly the Southern Brown Bandicoot (*Isodon obesulus*) and the possible presence of the critically endangered Western Swamp Tortoise (*Pseudemydura umbrina*);**

- retention of the functions of Swan Coastal Plain wetlands which may be affected by this proposal; and

(iii) proper management of (ii) above.

Accordingly, the Environmental Protection Authority recommends that the proposal could proceed subject to the proponent's environmental commitments listed in Appendix 1 and the following recommendations and Recommended Environmental Conditions.

Recommended Environmental Conditions are listed in Section 8 of this report.

6.1 Water quality and quantity

Issue

The change in land use from a rural or a natural area to an urban one can have a significant effect on the natural surface water and ground water regime. Surface water run-off or drainage characteristics change, resulting in changes to the groundwater balance. Urbanisation affects the quality of both surface and ground water. A particular area of concern with the Egerton development is the potential for nutrients in urban drainage water being discharged into Ellen Brook and flowing to the Swan River.

Recent investigations indicate that Ellen Brook has been discharging large amounts of nutrients, particularly phosphorus, to the Swan River. Ellen Brook contributes an average load of 26 tonnes of phosphorus and 77 tonnes of nitrogen per year to the Swan River. Ellen Brook has been identified as having the highest concentration of phosphorus of the streams discharging to the Swan-Canning estuary (Swan River Trust 1993b).

The Swan River Trust is concerned that continued discharges of phosphorus rich run-off from Ellen Brook and similar catchments may cause a shift in Swan River phytoplankton communities toward seasonal dominance by blue-green species, and possibly result in problems similar to those being experienced in the Peel-Harvey estuary, or the Murray-Darling river system in the eastern states (Swan River Trust 1993b).

Increased nutrient levels and other pollutants contribute to increased algal growth and deterioration of water quality. Therefore increased levels of nutrients from urbanisation could have an impact on Ellen Brook and the Swan River as well as the conservation values of the wetland systems including the seepage area referred to in submissions as the mound spring.

Urbanisation tends to increase water table levels as a result of an increase in impervious surfaces, lower evapotranspiration losses due to the removal of trees and other vegetation and by the importation of scheme water for domestic use within the urban area. To minimise these changes or to lower naturally high water tables to allow development to proceed, drainage systems are often installed.

Changes in ground water levels either up or down could have an impact upon:

- the conservation values of the wetland systems and surrounding vegetation associations (Froend, et al. 1993)
- the amount of water available for abstraction; and
- the activities and lifestyles of adjoining land owners.

Submissions raised a number of concerns in regard to hydrological impacts associated with the proposal. In particular, concerns were raised regarding potential impacts to natural features and to adjoining rural lands associated with changes in ground water levels due to urbanisation (see Appendix 2). The submissions highlighted the complex hydrology and geomorphology of the Egerton area and indicated the inadequacy of the Consultative Environmental Review report in presenting a proper public account of the areas hydrology and its impacts.

Views of other agencies

The Water Authority of Western Australia has indicated that the proposed Drainage Management Plan must comply with the Authority's Arterial Drainage Scheme Plan for the North East Corridor.

Proponent's response

The drainage system will be based on the broad principles established under the North-East Corridor Drainage Strategy of the Water Authority of Western Australia. The drainage management measures proposed at Egerton involve surface drainage by conventional road gullies and underground pipes connecting to disposal basins located in Open Space Areas. These will include the existing basins or dams in the creek lines. There also will be retention basins within the system to enable the control of run-off quantity and quality.

A water sensitive approach will be adopted for design and construction of the drainage system to maximise the potential for groundwater recharge and minimise the risk of pollution of downstream receiving waters including wetlands or high groundwater levels.

The proponent has indicated that the management of groundwater levels and surface water run-off will be emphasised in the detailed design for the Egerton urban estate and a specific Drainage Management Plan is being prepared for this purpose (see commitment 5.2 Appendix 1).

Environmental Protection Authority assessment

The Consultative Environmental Review does not address water quality and quantity in a detailed way. The report presents the broad objectives of water management and provides a general indication of the management approach required. However, the proponent recognises the need for the preparation of a more detailed Drainage Management Plan and has provided a specific commitment to do so. (see commitment 5.2 Appendix 1)

In adopting this approach, decisions on the acceptability of the water quality and quantity management proposed are deferred until later in the environmental assessment process. Any decisions made at this time by the Environmental Protection Authority on the proposed water quality and quantity management must be based upon the broad principles provided by the proponent and advice from relevant agencies such as the Water Authority of Western Australia and the Swan River Trust. In these circumstances, the Authority's advice is necessarily conditional pending the more detailed information.

In view of the high level of public concern and the absence of detailed information regarding water quality and quantity management it is highly desirable that decisions made by the planning process on the lifting of urban deferred zoning of this land are made within the context of the environmental assessment provided by the Consultative Environmental Review process and subsequent setting of environmental conditions.

The Environmental Protection Authority considers that an important part of the overall management of water quality and quantity for the site is the establishment of criteria which protect the environmental and community values of concern. Specific criteria arising from development of Egerton are required for the:

- water quality parameters (loads as well as concentrations) for the minimisation of nutrient export to Ellen Brook and ultimately the Swan River;
- water level and water quality criteria for the protection of wetlands (which can probably be achieved through management of drainage); and
- the protection of adjoining land uses from unacceptable changes in groundwater levels (e.g. flooding/ death of groundwater dependent vegetation).

The above requirements are reflected in recommendations 2 and 3 below.

Recommendation 2

The Environmental Protection Authority recommends that, prior to lifting of "Urban Deferred" to "Urban" in the Metropolitan Region Scheme, the proponent should establish environmental criteria and objectives for:

- (i) water quality parameters for the minimisation of nutrient export to Ellen Brook and the Swan River (loads as well as concentrations); and
- (ii) water level and water quality criteria which will ensure the maintenance of wetland function, and protect adjoining land uses.

The fulfilment of (i) & (ii) above should be to the requirements of the Minister for the Environment on advice from the Environmental Protection Authority, the Water Authority of Western Australia, the Swan River Trust and the Shire of Swan.

Recommendation 3

The Environmental Protection Authority recommends that, prior to adoption of the structure plan required by the Shire of Swan Town Planning Scheme, the proponent should prepare a detailed Environmental Management Program (EMP) for nutrient and drainage management which complies with the environmental criteria and objectives established by Recommendation 2 and which includes the development of a comprehensive monitoring, management and reporting program, to meet the requirements of the Minister for the Environment on advice of the Environmental Protection Authority, the Water Authority of Western Australia, the Swan River Trust and the Shire of Swan.

The EMP should be implemented to meet the requirements of the Environmental Protection Authority on advice from the Water Authority of Western Australia, the Swan River Trust and the Shire of Swan.

Since the release of the Consultative Environmental Review, the Water Authority of Western Australia, the Swan River Trust and the Department of Environmental Protection have been assisting the proponent in establishing acceptable water quality and quantity criteria for the project. As part of this process the proponent has undertaken specific on-site investigations and used hydrological models to assist in identifying the drainage measures required for the site. Recommended environmental condition 3 in section 8 of this report reflects the requirements for water quality and quantity management.

6.2 Remnant vegetation and flora

Issue

The proponent indicates that the native vegetation on Egerton has largely been cleared with most of the sand ridges occupied by pine plantation and much of the plain used for agricultural purposes. The remaining native vegetation belongs to the Southern River Vegetation Complex as mapped by (Hedde, et al. 1980). This unit typically consists of open woodlands of Marri-Jarrah and *Banksia* species with fringing woodlands of Flooded Gum - Paperbark along creek beds. The *Banksia* Woodland in the north-west corner of the site is more closely aligned to vegetation of the Bassendean Complex North which abuts the property to the west (Allan Tingay & Associates 1994b).

The Consultative Environmental Review report indicated that a total of 159 native species have been recorded in the Egerton property. Field surveys conducted by the proponent subsequent to the Consultative Environmental Review report release have identified several more native plant species in the wetland areas. No declared Rare Flora species have been recorded at Egerton (Allan Tingay & Associates 1994b).

Submissions expressed concerns regarding the presence of unusual flora species associated with the 'Mound Spring' or seepage area in the north-west of the subject land and in regard to other species of flora, (see Appendix 1). Concerns were also raised in regard to the loss of *Banksia* and Eucalypt Woodland on the property.

Proponents response

Most of the areas affected by the residential components of the Egerton Structure Plan are currently substantially cleared of native vegetation or support pine plantations. Of the remaining areas of natural vegetation, the sumplands and associated high quality vegetation are protected within public open space, which has been designed specifically for the conservation of vegetation and fauna habitat. Much of the *Banksia* and Eucalypt Woodland in the north-west sector, however, would be removed. (Tingay 1994)

The proponent has indicated that significant areas of *Banksia* and Eucalypt Woodland will be protected in the conservation area established through environmental assessment of the adjoining Ellenbrook land, and that no species of flora found at Egerton are Declared Rare Flora.

Environmental Protection Authority assessment

In its evaluation of the Ellenbrook proposal the Environmental Protection Authority considered that the regional conservation significance of the vegetation associations, the presence of high species diversity, lakes protected by the Environmental Protection (Swan Coastal Plain Lakes) Policy Approval Order 1992 and the relative undisturbed nature of the site warranted its setting aside for conservation.

Currently about 450 ha of the Ellenbrook land is zoned Parks and Recreation. A further area is proposed for rezoning from Urban Deferred to Parks and Recreation in Metropolitan Region Scheme Amendment 950/33 which is currently under consideration.

It is the Environmental Protection Authority's view that the Egerton land does not include the same elements of such high regional conservation value as the adjoining Ellenbrook land. Nevertheless, the Egerton land does contain wetland habitat in association with rare fauna, and considerable wetland areas which are only slightly degraded.

The Authority supports the retention of native vegetation on the Egerton land within Public Open Space for conservation. It is the Authority's view that consideration should be given by the proponent and the planning agencies to:

- the protection of wetland vegetation;
- the inclusion of surrounding dryland buffer areas sufficient to provide winter refuge for bandicoots and protect the wetlands from adjoining land use'
- the retention of vegetated linkages between wetland and areas of habitat to provide for exchange of genetic resources; and
- to provide refuges and resource banks in the event of a major disturbance event (e.g. fire) in any one area.

Recommendation 4 below is consistent with the urban conservation strategy and the above assessment.

6.2.1 Mound Spring

Issue

In its assessment of the Ellenbrook urban rezoning, subdivision and development (Environmental Protection Authority 1992a), the Environmental Protection Authority received a number of submissions which identified the presence of a 'Mound Spring' in the north west corner of the Egerton land. The submissions also mentioned the presence of unusual vegetation found in association with this feature.

As a result of this information, the Environmental Protection Authority identified the 'Mound Spring' as a key issue in guidelines provided to the proponent, Multiplex Constructions Pty Ltd, to assist them in the preparation of the Consultative Environmental Review for the Egerton proposal.

A number of the public submissions received for the Egerton proposal expressed concern regarding the protection of the 'Mound Spring' area (See Section 3.4 in Appendix 2 of this report).

The Australian Heritage Commission, in correspondence to the Environmental Protection Authority of 13 May 1994 indicated that a National Estate listing for the Ellenbrook area will be gazetted late in 1994. The proposed listing is shown in Figure 2 and includes the seepage area known locally as the 'mound spring'.

The proponent's response

The proponent states that "...the entire property was closely inspected and no evidence of a mound spring was found. A notable seepage area is located near the sumpland in the north-west sector of the property. It may be that the term mound spring has been used to refer to this seepage of water associated with the Gngangara Mound rather than with a true mound spring." (Allan Tingay & Associates 1994a).

An assessment of the seepage area conducted by the Geological Survey of Western Australia concluded that the groundwater flowing from the seepage area originates from relatively young shallow groundwater within the Bassendean Sand aquifer to the west known as the Gngangara Groundwater Mound. Groundwater discharge from this aquifer results in seepage where the contact between the Bassendean Sand and underlying clayey Guildford Formation is exposed. This type of seepage is common in the Swan Valley (Allan Tingay & Associates 1994a).

The proponent has indicated that the water seepage in the north-west sector of the property which has been referred to as a 'mound spring' will be retained within Open Space and that the proposed Drainage Management Plan will seek to ensure that the seepage continues. (Tingay & Associates, February 1994)

In response number 3.4.1 of Appendix 1 of this report, the proponent has indicated that any flora or fauna associated with the groundwater seepage area will be conserved within the Public Open Space.

Environmental Protection Authority assessment

Irrespective of whether or not the wetland area in the north west of the Egerton land is a true 'Mound spring' or as stated in the Consultative Environmental Review a water seepage area, the proponent has indicated an intention to incorporate the area, and any flora or fauna associated with the wetland area, within Public Open Space for the main purpose of conservation.

The proponent has also indicated through the proposed Drainage Management Plan, its intention to ensure that the seepage continues.

In view of Recommendations 1 and 4 in this report, and the proponent's commitment to prepare management plans for the Open Space areas at Egerton (See commitment 5.1, Appendix 1), the Environmental Protection Authority considers that a specific recommendation in regard to this feature is not required.

6.3 Swan Coastal Plain wetlands

Issue

There are no wetlands affected by the Egerton proposal which are protected by the Environmental Protection (Swan Coastal Plain Lakes) Policy Approval Order 1992. However a number of wetlands which have been identified in the wetland mapping and classification work undertaken by the Water Authority of Western Australia would be affected by the proposal.

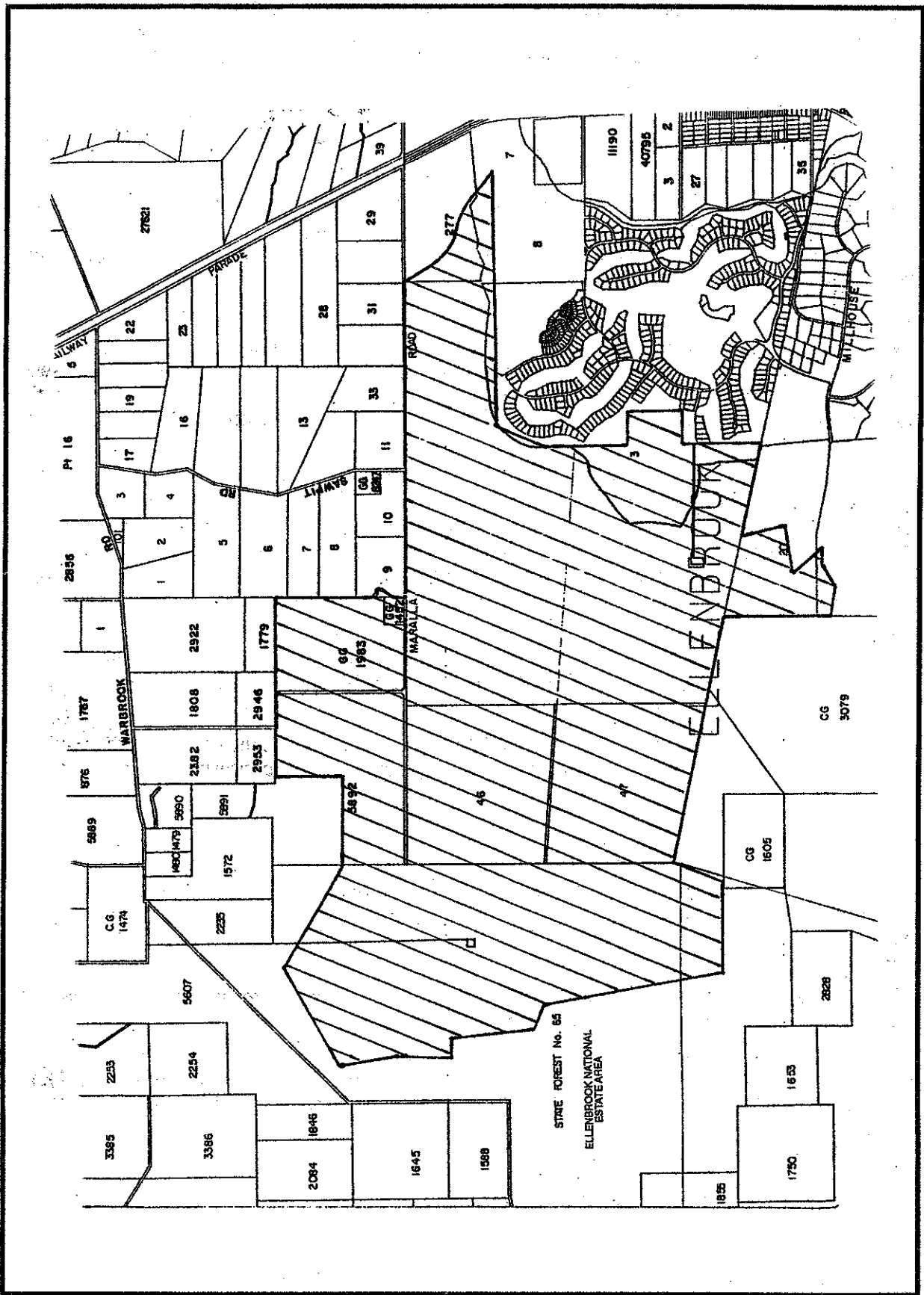


Figure 2. Proposed Ellenbrook National Estate Area as shown in correspondence to the Environmental Protection Authority dated 13 May 1994.

These include seasonally inundated sumplands of the Muchea Suite and flat wetlands including seasonally inundated floodplains and seasonally waterlogged palusplains (Refer Figure 13 of the Consultative Environmental Review). The groundwater table is at, or just below, the surface of the ground in the palusplain.

A number of seasonally inundated creeks also traverse the subject land. "The seasonal creeks at Egerton cross the palusplain mainly in the north-east sector of the property and flow to Ellen Brook. In places the creeks have been dammed to provide water for agricultural purposes and at least one of these dams has heritage significance." (Allan Tingay & Associates 1994a).

The wetlands were categorised using the Environmental Protection Authority's wetland evaluation method published in Bulletin 374 *A guide to wetland management in Perth* (recently updated by Bulletin 686), as Resource Enhancement or Multiple Use wetlands. The sumplands were categorised as Resource Enhancement, where the management objective is to maintain and enhance the existing ecological function. The palusplain is categorised as Multiple Use where the management objectives should be considered in the context of catchment and land use planning (especially drainage, nutrient enrichment, surface and groundwater pollution), in terms of the current value of the wetland and the potential value to the community if rehabilitated.

However, investigations by the proponent indicate that "...the sumplands remain in the Resource Enhancement Category in terms of their general attributes but some can also be included in the High Conservation Category as a result of the presence of a rare and endangered species, the Southern Brown Bandicoot (*Isodon obesulus*)" (Allan Tingay & Associates 1994b).

Following investigation of wetlands on the subject land, the proponent has also advocated that some changes to the wetland classification indicated on the Water Authority maps is required. "This investigation indicated that one area shown as sumpland on the WAWA map is actually a palusplain. This area is in the south-west sector adjacent to the western boundary." (Allan Tingay & Associates 1994b).

The Environmental Protection Authority notes from the Water Authority maps that two small sumplands located in the eastern part of the subject land are not represented in Figure 12 of the proponent's report or represented within the Structure Plan. In addition, the Structure Plan does not indicate the width of separation between proposed development and the wetlands retained within the Open Space.

The Environmental Protection Authority recognises that waterbodies in their natural state are generally surrounded by two 'layers' of vegetation, of varying widths and distinction. Immediately adjacent to the waterbody, fringing or wetland vegetation occurs which is directly dependent on the close proximity of the watertable in these areas. Fringing vegetation may include emergent species, paperbarks, riparian vegetation along watercourses, and other species that can tolerate wet conditions. In turn, the fringing vegetation is surrounded by the 'dryland buffer', comprising dryland vegetation that is less tolerant of wet and waterlogged soil conditions.

With the exception of parts of the Mound Spring area in the north west of the Egerton land the Environmental Protection Authority notes that most other wetlands on the property are surrounded by pine plantation or cleared pasture and do not have an existing 'dryland buffer' consisting of natural vegetation.

However, all waterbodies are affected by nearby land uses: whether they are immediately adjacent to that waterbody, or carried out at some distance from the waterbody but within its catchment. Vegetation buffers for waterbodies provide important functions which include:

- separating water habitats from human activities on surrounding land;
- providing complementary habitats for fauna (e.g. Bandicoots, waterbirds) using the waterbody; and
- trapping nutrients and sediments entering a waterbody.

The proponent's response

The proponent has indicated that significant earthworks will be required for certain parts of Egerton.

"The areas involved include seasonally inundated sumplands and seasonally waterlogged palusplain areas in the south and south-west sectors of the property and much of the extensive palusplain in the central-east and north-east sectors. Virtually all these are currently use for agricultural purposes and consist of pasture with remnant trees." (Allan Tingay & Associates 1994b).

The public submissions raised a number of concerns in regard to the protection of wetlands and in response to these concerns the proponent has indicated that no sumplands are planned for development (see Appendix 2). In their report the proponent indicated that the sumplands are considered to be the primary environmental asset of the Egerton property and they substantially have been included within the area to be set aside as Public Open Space. However, as indicated above, the proponent has stated that some low lying areas which includes the seasonally waterlogged palusplain will need to be filled to provide a suitable surface for the development of houses and installation of services. The proponent considers that the filling of most of these areas is not considered to have important environmental implications (Allan Tingay & Associates 1994b).

The creeks will be modified as necessary for drainage purposes but substantially will remain in their present state and alignment. The remaining natural vegetation along the creek lines and around the dam will substantially be left intact and will be supplemented by appropriate landscaping and further tree planting.

Environmental Protection Authority assessment

The Environmental Protection Authority considers that all wetlands have special value and that they should be appropriately managed to maintain their human use and natural values when assessing possible uses.

The Environmental Protection Authority notes that the extent of Public Open Space allocated in the Egerton Structure Plan is 84ha which constitutes 17% of the development area. Of this "...11ha will be for sports grounds and smaller parks, 27.8ha will be for parkland corridors and water bodies (drainage), 10.7 ha will be for a zoological garden..." (it is possible that the zoological gardens may be privately owned and therefore may not constitute part of the Open Space) "...and 34.5ha will be for conservation." (Appendix 2, Response 2.1). This contribution to Public Open Space is supported by the Environmental Protection Authority.

The Environmental Protection Authority notes the commitment by the proponent to prepare management plans for the Open Space areas at Egerton and that the objective is to provide for the retention of the majority of the natural vegetation and associations of the Muehea Suite sumplands. The Environmental Protection Authority considers that the proponent should prepare a strategy for the management of wetlands on the site which addresses the following issues:

- the boundary of the Public Open Space having regard for wetland conservation and the associated need for a 'dryland buffer';
- wetland function(s) should be defined; and
- the management requirements necessary to protect wetland function(s) and the agency responsible for on-going management and monitoring.

The Authority notes that large areas of the palusplain will be used for development. However, the palusplain is largely degraded and therefore not regarded as regionally significant for its conservation value.

Recommendation 4

The Environmental Protection Authority recommends that prior to adoption of the structure plan required by the Shire of Swan Town Planning Scheme, the proponent prepare and subsequently implement a strategy for the management of the wetlands on the site which includes but is not limited to consideration of the following:

- the boundary of the Public Open Space having regard for wetland conservation and the associated need for a 'dryland buffer';
- wetland function(s) should be defined; and
- the management requirements necessary to protect wetland function(s) and the agency responsible for on-going management and monitoring should be identified.

to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority and the Shire of Swan.

6.4 Fauna

Issue

A vertebrate fauna survey of the Egerton property was carried out by Alan Tingay & Associates in October 1993. The survey was designed to encompass the major habitat types on the property, and included *Banksia* Woodlands, *Melaleuca* Woodland and *Melaleuca* Forest, Heath, and pine plantation with a mixture of *Eucalyptus* spp.

Fifty species of indigenous (native) vertebrates were recorded during the survey including 5 species of frogs, 6 reptiles, 36 birds and 3 species of mammals (Allan Tingay & Associates 1994b).

One of the mammal species found, the Southern Brown Bandicoot (*Isoodon obesulus*), is listed on Schedule 1 (species which are likely to become extinct or are rare) of the Wildlife Conservation Act.

Concerns were expressed in submissions that the proposal would result in the loss of habitat utilised by the Southern Brown Bandicoot and that this would result in loss of the animals. Other issues of concern included the impact of the proposal on other species of fauna including the Honey Possum, Brown Gloved Wallaby, species of birds such as herons, egrets and ibis which utilise palusplain areas and other general fauna issues. (refer to Appendix 2, Section 1).

The Consultative Environmental Review does not mention whether or not the area has potential for Western Swamp Tortoise (*Pseudemadura umbrina*) habitat. The Western Swamp Tortoise is considered to be the most endangered vertebrate animal in Australia and has been declared as fauna that is 'likely to become extinct or is rare' under the Wildlife Conservation Act (Burbidge, et al. 1990).

Advice from other agencies

The Department of Conservation and Land Management in its submission has recommended that the resident Southern Brown Bandicoot population be monitored and managed on site by the proponents. In view of this recommendation, the Department of Conservation and Land Management has also indicated that "...it is important that both core habitat areas and some winter (dry) refuge areas are retained (for example, the north-west woodland area)." (Department of Conservation and Land Management, 16 March 1994)

The Department of Conservation and Land Management has indicated in its submission that the Western Swamp Tortoise appears on the Consultative Environmental Review's list of species present on the Swan Coastal Plain, with no record for Egerton. In view of the proximity of the Egerton land to the Ellenbrook Nature Reserve and the presence of wetland areas on the subject

land, the Department of Conservation and Land Management recommends that a special survey for the Western Swamp Tortoise be undertaken. (Department of Conservation and Land Management, 16 March 1994)

Proponents response

The proponent has provided a commitment to:

Seek advice from the Minister for the Environment on the preferred method for management of the Southern Brown Bandicoot population and prepare and implement a strategy based on that advice to the satisfaction of the Minister prior to development. (see commitment 5.3 Appendix 1)

The proponent has indicated in response to public submissions that it will provide a more detailed evaluation of the site's suitability for the Western Swamp Tortoise in consultation with the Department of Conservation and Land Management (see Appendix 2, response 1.1).

The proponent has concluded that "...the vertebrate fauna at Egerton is not significant in terms of regional conservation. Nevertheless, the fauna has local intrinsic significance and certain features of the Structure Plan have been specifically designed to promote the possibility that the majority of the vertebrate fauna species will continue to occur at Egerton following urban development." (Allan Tingay & Associates 1994b).

In the separate fauna survey report to the Consultative Environmental Review the proponent indicated that "Habitat linkage and corridors for fauna are also important in ensuring the viability and survival of many fauna populations. A small isolated population is much more vulnerable to localised extinction compared to one which has links to other populations and habitats. ...In retaining key areas at Egerton such as wetlands and fringing vegetation a network of linked areas could be provided to complement other conservation areas in the district." (Allan Tingay & Associates 1994b).

The Environmental Protection Authority's evaluation

Southern Brown Bandicoot

Provided the proponent prepares a management strategy for the protection of the Southern Brown Bandicoot which accommodates the requirements of the Department of Conservation and Land Management prior to rezoning of the land in the local authority Town Planning Scheme, the Environmental Protection Authority has concluded that the potential impacts are environmentally acceptable.

However, in regard to the population of Southern Brown Bandicoot, the EPA considers that in order to maximise the potential for a sustainable population of bandicoots on-site, some winter (dry) refuge areas will need to be retained in addition to core habitat areas. Winter (dry) refuge areas may include areas of Banksia woodland in proximity to core habitat areas in the north east of the subject land and/or degraded buffer areas which could be revegetated with appropriate species.

It is expected that the needs of the Southern Brown Bandicoot would be considered in defining the boundaries of public open space (see Recommendation 4 above).

The retention of vegetated habitat areas and linkages which afford a reasonable degree of protection from predators is recognised as an important component in the management of bandicoots and other fauna. Appropriate subdivision design and specific management initiatives for habitat areas will assist in the protection of the Southern Brown Bandicoot population.

Western Swamp Tortoise

Provided the proponent undertakes a detailed survey for the Western Swamp Tortoise and subsequently prepares a management strategy, to the requirements of the Department of Conservation and Land Management, prior to rezoning of the land in the local authority Town Planning Scheme, the Environmental Protection Authority has concluded that the potential impacts are environmentally acceptable.

The results of specific investigations for the Western Swamp Tortoise for the adjoining Ellenbrook development (EPA Bulletin 642), failed to locate any Western Swamp Tortoise's. Given similarities in habitat types between Ellenbrook and Egerton, the Environmental Protection Authority considers that it is unlikely that any Western Swamp Tortoise's will be found on the Egerton land. Nevertheless, it is the Environmental Protection Authority's view that should Western Swamp Tortoise be located on the Egerton land, then the proponent may be required to make changes to the proposed Structure Plan to ensure protection of this species and its habitat.

Recommendation 5

The Environmental Protection Authority recommends that prior to rezoning in the local authority Town Planning Scheme, Multiplex Constructions Pty Ltd prepare and subsequently implement a strategy for the protection of the Southern Brown Bandicoot (*Isodon obesulus*) population to the requirements of the Environmental Protection Authority on advice from the Department of Conservation and Land Management.

Recommendation 6

The Environmental Protection Authority recommends that prior to rezoning in the local authority Town Planning Scheme, Multiplex Constructions Pty Ltd undertake a detailed survey for the Western Swamp Tortoise (*Pseudemydura umbrina*) and subsequently implement an approved strategy for this species, to the requirements of the Environmental Protection Authority on advice from the Department of Conservation and Land Management.

6.5 Water supply and sewage disposal

6.5.1 Water supply

From the proponent

The water supply to Egerton will be derived from the Lexia borefield operated by the Water Authority of Western Australia on the Gnangara Mound to the west. Supply to both Ellenbrook and Egerton will be via trunk and distribution water mains linking to a main reservoir and treatment plant located on higher ground along the State Forest boundaries west of Ellenbrook. Separate high level reservoirs may be required to service the higher sectors of Egerton (Allan Tingay & Associates 1994a).

The water supply facilities will be implemented in stages and it is expected that initial supply will be via permanent bores within the Lexia system on the Gnangara Mound to the west and a permanent high level reservoir or temporary on ground reservoir within the estate itself. Temporary treatment facilities will also be constructed either as a central plant or as separate plants at each bore site (Allan Tingay & Associates 1994a).

Environmental Protection Authority assessment

As indicated in its assessment of the adjoining Ellenbrook proposal (EPA Bulletin 642), the Environmental Protection Authority considers that the establishment of the Water Authority's Lexia Groundwater Scheme, including the reservoir and treatment plant will require separate environmental impact assessment to ensure potential environmental impacts associated with groundwater abstraction and siting of these facilities, such as wetland protection, remnant vegetation protection, habitat protection and ecosystem protection are considered. The preparation of the environmental review is the responsibility of the Water Authority of Western Australia and should be completed prior to commencement of the Scheme.

6.5.2 Sewage disposal

From the proponent

The Egerton estate will be deep sewered. However, the capital costs of projected works to collect and pump sewage to existing and future treatment plants to the west will be very high and, as a result, a number of alternative schemes are being considered as part of the planning for both the Egerton and adjoining Ellenbrook proposals.

These alternative schemes include systems for the on-site treatment and disposal of sewage incorporating both permanent and temporary facilities staged to suit the pattern and rate of urbanisation. Such treatment would be in package plants incorporating secondary and tertiary process systems as necessary to meet any environmental requirements for effluent disposal. A range of disposal options exist including on-site irrigation, dual water supply, seepage, etc. These will need to be investigated as part of more detailed planning, however, initial assessments suggest that the concepts involved are feasible. It is possible that on-site facilities may become the long term permanent scheme for sewerage of the area (Allan Tingay & Associates 1994a).

The Environmental Protection Authority's evaluation

Full details associated with the location and operation of sewerage treatment works and infrastructure is not provided in the report. Nevertheless, in view of the proximity of the subject land to Ellen Brook which ultimately discharges into the Swan River, groundwater and drainage considerations and the complex hydrology of the area, the Environmental Protection Authority considers that the establishment of on-site effluent disposal facilities, if proposed, will require separate environmental assessment at the appropriate time.

7. Conclusion

The Environmental Protection Authority concludes that the proposal can be made environmentally acceptable provided the proponent's commitments and the recommendations of this report are implemented.

The Environmental Protection Authority has established an implementation and auditing system which requires the proponent to advise the Authority on how it would meet the requirements of the environmental conditions and commitments of the project. The proponent would be required to develop a Progress and Compliance report for this project as a section of the recommended audit programs.

The Environmental Protection Authority's experience is that it is common for details of a proposal to alter through the detailed design and construction phase. In many cases alterations are not environmentally significant or have a positive effect on the environmental performance of the project. The Environmental Protection Authority believes that such *non-substantial* changes, and especially those which improve environmental performance and protection, should be provided for.

The Environmental Protection Authority believes that any approval for the proposal based on this assessment should be limited to five years. Accordingly, if the proposal has not been substantially commenced within five years of the date of this report, then such approval should lapse. After that time, further consideration of the proposal should occur only following a new referral to the Environmental Protection Authority.

8. Recommended environmental conditions

Based on the assessment of this proposal and recommendations in this report, the Environmental Protection Authority considers that the following Recommended Environmental Conditions are appropriate.

1 Proponent Commitments

The proponent has made a number of environmental management commitments in order to protect the environment.

- 1-1 In implementing the proposal, the proponent shall fulfil the commitments made in the Consultative Environmental Review and in response to issues raised following public submissions; provided that the commitments are not inconsistent with the conditions or procedures contained in this statement. These commitments are consolidated in Environmental Protection Authority Bulletin 743 as Appendix 1. (A copy of the commitments is attached.)

2 Implementation

Changes to the proposal which are not substantial may be carried out with the approval of the Minister for the Environment.

- 2-1 Subject to these conditions, the manner of detailed implementation of the proposal shall conform in substance with that set out in any designs, specifications, plans or other technical material submitted by the proponent to the Environmental Protection Authority with the proposal. Where, in the course of that detailed implementation, the proponent seeks to change those designs, specifications, plans or other technical material in any way that the Minister for the Environment determines on the advice of the Environmental Protection Authority, is not substantial, those changes may be effected.

3 Drainage and Nutrient Management

Establishment of environmental criteria and objectives for drainage and nutrient management and implementation of an Environmental Management Programme is required.

- 3-1 Prior to the lifting of "Urban Deferred" to "Urban" zoning in the Metropolitan Region Scheme, the proponent shall establish environmental criteria and objectives for water quality and quantity to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority, the Water Authority of Western Australia, the Swan River Trust and the Shire of Swan.

These criteria and objectives shall include, but not be limited to, consideration of:

- (1) Water quality parameters for the minimisation of nutrient export to the Swan River (loads as well as concentrations); and
 - (2) Water level and water quality criteria which will ensure the maintenance of wetland function, and protect adjoining land uses.
- 3-2 Prior to adoption of the structure plan required by the Shire of Swan Town Planning Scheme, the proponent shall prepare an Environmental Management Programme for nutrient and drainage management designed to achieve the environmental criteria and objectives established by condition 3-1 and which includes the development of a comprehensive monitoring, management and reporting programme to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority, the Water Authority of Western Australia, the Swan River Trust and the Shire of Swan.

- 3-3 The proponent shall implement the Environmental Management Programme required by condition 3-2 to the requirements of the Environmental Protection Authority on advice of the Water Authority of Western Australia, the Swan River Trust and the Shire of Swan.

4 Urban Conservation and Wetland Management

Final subdivision design should ensure the protection of wetlands and populations of fauna gazetted under the Wildlife Protection Act which may be impacted by the proposal.

- 4-1 Prior to adoption of the structure plan required by the Shire of Swan Town Planning Scheme, the proponent shall prepare a strategy for management of wetlands on the site to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

This strategy shall include but not be limited to the following:

- 1 definition of the boundary of the Public Open Space conservation areas having regard for wetland conservation and the associated need for dry land buffers;
- 2 definition of wetland functions; and
- 3 management requirements for protection of wetland functions and identification of the agency responsible for management and monitoring.

- 4-2 The proponent shall implement the strategy required by condition 4-1.

- 4-3 Prior to adoption of the structure plan required by the Shire of Swan Town Planning Scheme, the proponent shall prepare a strategy for protection of the Southern Brown Bandicoot (*Isodon obesulus*) to achieve the objectives of condition 4-1 to the requirements of the Minister for the Environment on advice of the Department of Conservation and Land Management.

- 4-4 The proponent shall implement the strategy required by condition 4-3 to the requirements of the Minister for the Environment on advice of the Department of Conservation and Land Management.

- 4-5 Prior to adoption of the structure plan required by the Shire of Swan Town Planning Scheme, the proponent shall undertake a comprehensive survey of the site to locate populations of the Western Swamp Tortoise (*P umbrina*) to the requirements of the Minister for the Environment on advice of the Department of Conservation and Land Management.

- 4-6 Prior to adoption of the structure plan required by the Shire of Swan Town Planning Scheme, the proponent shall prepare a strategy for protection of populations of the Western Swamp Tortoise if any are located by the survey required by condition 4-5 to the requirements of the Minister for the Environment on advice of the Department of Conservation and Land Management.

- 4-7 The proponent shall implement the strategy required by condition 4-6 to the requirements of the Minister for the Environment on advice of the Department of Conservation and Land Management.

5 Proponent

These conditions legally apply to the nominated proponent.

- 5-1 No transfer of ownership, control or management of the project which would give rise to a need for the replacement of the proponent shall take place until the Minister for the Environment has advised the proponent that approval has been given for the nomination

of a replacement proponent. Any request for the exercise of that power of the Minister shall be accompanied by a copy of this statement endorsed with an undertaking by the proposed replacement proponent to carry out the project in accordance with the conditions and procedures set out in the statement.

6 Time Limit on Approval

The environmental approval for this proposal is limited.

- 6-1 If the proponent has not substantially commenced the project within five years of the date of this statement, then the approval to implement the proposal as granted in this statement shall lapse and be void. The Minister for the Environment shall determine any question as to whether the project has been substantially commenced. Any application to extend the period of five years referred to in this condition shall be made before the expiration of that period, to the Minister for the Environment by way of a request for a change in the condition under Section 46 of the Environmental Protection Act. (On expiration of the five year period, further consideration of the proposal can only occur following a new referral to the Environmental Protection Authority.)

7 Compliance Auditing

In order to ensure that environmental conditions and commitments are met, an audit system is required.

- 7-1 To help verify environmental performance, the proponent shall prepare periodic Progress and Compliance Reports in consultation with the Environmental Protection Authority and provide results of any monitoring programmes.

Procedure

- 1 The Environmental Protection Authority is responsible for verifying compliance with the conditions contained in this statement, with the exception of conditions stating that the proponent shall meet the requirements of either the Minister for the Environment or any other government agency.
- 2 If the Environmental Protection Authority, other government agency or proponent is in dispute concerning compliance with the conditions contained in this statement, that dispute will be determined by the Minister for the Environment.

9. References

- Allan Tingay & Associates 1994a, *Egerton Structure Plan Consultative Environmental Review*, Perth WA, Report 93/61, February 1994
- Allan Tingay & Associates 1994b, *Egerton fauna survey technical report; Supplement to Consultative Environmental Review*, Perth WA, Report 93/74, February 1994
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Appendix 1

Proponent's commitments

5. COMMITMENTS

Multiplex Constructions Pty Ltd, will:

- 5.1 Prepare management plans for the Open Space areas at Egerton which will have the objective to provide for the retention of the majority of the natural vegetation and associations of the Muchea Suite sumplands. The management plans will be prepared prior to final subdivision approval to the satisfaction of DPUD and the Shire of Swan.
- 5.2 Prior to the commencement of any major works, prepare a Drainage Management Plan for Egerton to the satisfaction of the EPA.
- 5.3 Seek advice from the Minister for the Environment on the preferred method for management of the Southern Brown Bandicoot population and prepare and implement a strategy based on that advice to the satisfaction of the Minister prior to development.
- 5.4 Comply with all requirements of the Aboriginal Heritage Act, 1972-1980.

Appendix 2

Summary of submissions and proponent's response

REZONING OF EGERTON FROM URBAN DEFERRED TO URBAN

RESPONSES TO ISSUES RAISED BY PUBLIC SUBMISSIONS TO THE CONSULTATIVE ENVIRONMENTAL REVIEW BY MULTIPLEX CONSTRUCTIONS PTY LTD

1. Fauna/Habitat

Issue 1.1

The Consultative Environmental Review (CER) does not mention whether or not the area has potential for Western Swamp Tortoise (*Pseudemydura umbrina*) habitat.

Given the proximity to Ellenbrook Nature Reserve and the presence of the wetland areas a special survey for Western Swamp Tortoise is recommended by the Department of Conservation & Land Management (CALM).

Response 1.1

The wetlands at Egerton are mostly damplands similar to those at Ellenbrook. The assessment of wetlands in the Ellenbrook Development area by CALM officers in 1992 concluded that the area did not contain suitable habitat for the Western Swamp Tortoise.

Nevertheless the proponents will provide a more detailed evaluation of the site's suitability for the Western Swamp Tortoise in consultation with CALM.

Issue 1.2

Southern Brown Bandicoot habitat - CALM strongly recommends that the resident bandicoot population be monitored and managed on site by the proponents. Therefore, it is important that both core habitat areas and some winter (dry) refuge areas are retained, (for example - the north-west woodland area).

Response 1.2

The proponent has committed in the CER to seek advice from the Minister for the Environment on the preferred method for management of the Southern Brown Bandicoot population and to implement a strategy based on that advice.

CALM's advice will no doubt be sought by the Minister. The ability of proposed areas of Public Open Space (POS) to be viable for the long term sustainability of the population will be a vital consideration in the choice of management options.

Issue 1.3

The statement "It is considered reasonable therefore to assume that there is significant probability that bandicoots would survive at Egerton" on page 32 is wishful thinking in view of the small, 35ha size of the conservation area proposed. R How and J Dell in their paper, Vertebrate Fauna of the Perth Metropolitan Region: Consequences of a Modified Environment, 1992, state

categorically "no small ground dwelling mammals persist in areas up to 350ha". When the effect of predators such as cats and dogs is also taken into account it is clear that the rare and endangered Southern Brown Bandicoot in the Egerton area will not survive urban development.

Response 1.3

Detailed trapping programs of the Southern Brown Bandicoot in the Port Kennedy area have revealed that small areas of dense vegetation are able to support bandicoot populations. For example, at Singleton an 'island' of dense vegetation only 17ha in area and bounded on two sides by residential housing was estimated to contain 10 to 15 adult individuals.

The total open space provision within the development is 84ha. Although only 35ha is specifically listed as being designated for conservation, the habitat extends through the 'zoo' area and much of the parkland corridors.

Issue 1.4

To keep suggesting that bandicoots should be relocated is a stupid and unsatisfactory solution. It is widely accepted that the greatest (but not the only) threat to native fauna is the continuing loss of habitat.

Response 1.4

The management options for the bandicoots will be considered by the Minister for the Environment. Relocation is one option that could be considered. Relocation programs conducted by CALM result in re-introducing bandicoots into secure reserves in areas where bandicoots have become locally extinct.

Issue 1.5

The resident bandicoot population should be protected by providing a sufficiently large buffer zone around habitat areas.

Response 1.5

Bandicoots appear to be restricted to areas within and surrounding wetlands probably as a result of the dense cover in these areas. Some of these wetlands in which populations were found currently have no native 'buffer' zone but are bordered by a pine plantation on one side and pasture on the other. Pine plantations and pasture areas do not provide protection from predators and therefore are unlikely to be widely used by bandicoots. The wetland areas are not all wet in winter, but provide a variety of wet and damp habitats which appear to be suitable in their own right of supporting bandicoots.

Issue 1.6

This urbanisation proposal threatens significant ephemeral wetlands which are essential breeding areas for many species of waterbirds. This is documented in research carried out by CALM. As well these wetlands are important feeding sites.

Response 1.6

The quality of wetlands at Egerton identified in the CER ranges from slightly disturbed to degraded. The Structure Plan includes the retention of a large

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CALM's advice will no doubt be sought by the Minister. The ability of proposed areas of Public Open Space (POS) to be viable for the long term sustainability of the population will be a vital consideration in the choice of management options.

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Response 1.6

The quality of wetlands at Egerton identified in the CER ranges from slightly disturbed to degraded. The Structure Plan includes the retention of a large

proportion of the best quality wetlands. Additional habitats for waterbirds will be created in the design of the detention basins for stormwater control.

Issue 1.7

Palusplains are extensively used by specific species, including herons, egrets, ibis. The continuing loss of this habitat types threatens the widespread distribution of these species. It is likely that they will become locally extinct and their overall population will diminish if palusplains continue to be filled in. Inclusion of much of this area within a conservation reserve is strongly recommended.

Response 1.7

The areas of palusplain at Egerton are either completely degraded and used for pasture or severely disturbed and used for grazing. There are no palusplain areas at Egerton in sufficiently good condition to warrant reservation.

Issue 1.8

There is no detail on the extent of the fauna survey work, such as the number of days spent trapping, and the number of field visits. A paper by Turpin and Dell states that fauna surveys only provide valid information when they are extensive and conducted over several months.

Response 1.8

The full details of the fauna survey methodology and results have been reported in the Egerton Fauna Survey by Alan Tingay & Associates which is available for inspection at the Department of Environmental Protection (DEP).

Issue 1.9

No invertebrate studies have been done on the site, consequently the study remains incomplete. Why was not an invertebrate study undertaken when it would be likely, because of the unusual vegetation habitat provided at the Mound Spring, that unusual invertebrates may be found there?

Response 1.9

Detailed invertebrate studies have never been undertaken as part of an environmental review in Western Australia. Investigation by the Geological Survey Department of WA has found that this area is not a mound spring, but an area of seepage for superficial groundwater. Nevertheless, the 'Mound Spring' area will be protected in its present form. Therefore the value of an invertebrate study in this area, while of scientific interest, is not relevant to the CER.

Issue 1.10

Why has no effort been made to link conservation areas (public open space) in Egerton with Ellenbrook and therefore with Whiteman Park or other areas thus creating bush corridors rather than islands of habitat which, if subject to some single disastrous impact, e.g. fire, could eliminate locally some species of fauna?

Response 1.10

The proponent has no influence in structure planning for areas outside the Egerton property. The structure plan for Ellenbrook at the time of preparing the

CER did not provide any possibility of vegetation corridors with the Ellenbrook conservation area.

Issue 1.11

To state that the fauna is "typical of the region" is to ignore the fact that much of the diversity will be destroyed when the impact of human population the size of Bunbury is added to the area. The potential for bush to remain protected, and for the animals living there to survive is not a long term proposition.

Response 1.11

This comment seems to relate to the area in general as the population size of Bunbury is 28,000 and the Egerton Structure Plan is projected to cater for a approximately 11,800 people. As the question is of a regional nature, then the local conservation requirements should be satisfied by the nearby Ellenbrook Conservation Area.

Issue 1.12

Is the Brown Gloved Wallaby likely to be found in the area?

Response 1.12

The Brown Gloved Wallaby *Macropus irma* is known to occur at Ellenbrook and Whiteman Park. While habitat for it exists at Egerton, no individuals have been recorded during the fauna survey or during numerous other site inspections.

Issue 1.13

Banksia woodland is essential for the survival of the Honey Possum, and if the wildlife link between Ellenbrook and the Egerton area is removed, it will trap animals in islands and not allow any exchange of genetic material.

Response 1.13

The Honey Possum at Egerton was found in *Melaleuca raphiophylla* and *M. preissiana* Woodland surrounded by pine plantation and pasture. The nearest *Banksia* woodland was about 1km away to the north-west. The area is therefore already essentially an 'island' of native vegetation.

2. Vegetation/Flora

Issue 2.1

The three areas of remnant vegetation shown as "slightly disturbed" in Figure 16 should be protected if possible.

Response 2.1

The extent of Public Open Space (POS) allocated in the Egerton Structure Plan is 84ha or 17% of the development area which is well above the 10% POS normally expected from residential subdivisions. The 84ha includes 35.4ha for conservation. These conservation areas have been chosen from areas of slightly disturbed vegetation.

Issue 2.2

Important species of flora known to occur on the site are: (NB: advice not provided by CALM).

1. Liverworts *Goebelebryum unguiculatum*
Hyalolepidozia longiscypha
2. Fern Allies *Lycopodium serpentinum*
3. Dicotyledons *Drosera pulchella*
4. Priority 3 *Restio stenostachyus*
Conostephium minus
Aotus cordifolia
Gonocarpus pithyoides
5. Priority 4 *Stylidium utricularioides*

Response 2.2

Field surveys conducted subsequent to the CER release have identified several more native plant species in the wetland areas. These species include *Baumea preissii*, *Lepidosperma longitudinale*, *Cyathochaeta avenacea*, *Restio stenostachyus*, *Lycopodium serpentinum* and a liverwort species.

None of these additional species are Declared Rare Flora (DRF). *Restio stenostachyus* is a Priority 3 species and was found in the north-west wetland which will be protected from development.

This list included in the submission does not contain any DRF.

Issue 2.3

The liverworts and club moss along with the sundew, *Drosera pulchella*, are rare on the Swan Coastal Plain. Why has no mention been made of this status?

Response 2.3

See Response 2.2

None of these species are DRF or on CALM's priority list of flora (28/10/92). Their habitat in the north-west wetland will be nevertheless protected from development.

Issue 2.4

Have the consultants confirmed that 3 of the 6 species of flora found at Egerton and not Ellenbrook are "possibly just differences in identification"? If not, then it cannot be concluded that there are only 3 species not found at the Ellenbrook site. The discrepancies must be resolved in a scientific manner if the study is to be taken seriously.

Response 2.4

None of the species found at Egerton but not at Ellenbrook are considered DRF or priority species.

Issue 2.5

It is not acceptable that the proponents intend clearing *Conostephium minus*, a Priority 2 species of flora present on the site. Why cannot this species be protected on the Egerton site?

Response 2.5

Conostephium minus is a Priority 3 species which means that it has several poorly known populations with some on conservation lands. Recent research by CALM has recommended it to be 'downgraded' to Priority 4 - species in need of monitoring.

The submission on the CER by CALM does not recommend the protection of *C. minus* at Egerton. Stands of *C. minus* will be protected within the region in the proposed Ellenbrook conservation area.

Issue 2.6

The comment that other areas of woodlands are present in State Forest and conservation reserves is not acceptable as an excuse for the removal of the Banksia and Eucalypt woodland vegetation on the Egerton property. Banksia and other woodland areas should be protected and conserved.

Response 2.6

Significant areas of *Banksia* and Eucalypt Woodlands will be protected in the Ellenbrook conservation area. Wetland areas were considered to be more important for protection at Egerton.

Issue 2.7

Dieback is present in the development area. How will human public access to conservation areas in POS be managed and controlled to ensure the disease is not spread?

Response 2.7

Dieback has been recognised in two very small areas of *Banksia* and Eucalypt Woodland in the north-west corner. These areas will be developed for roads and/or housing.

To control disease in the POS areas, human access will be managed by providing public accessways and dual use paths through designated areas of the POS. Other areas will be fenced off and access discouraged. Most of the vegetation in wetlands is also resistant to dieback.

Issue 2.8

This area of Egerton and Ellenbrook supports the only known population of *Caladenia huegelii*, north of the river, and nine threatened plants which have been identified on CALM's priority species list. This has not been mentioned.

Response 2.8

The *Caladenia huegelii* previously reported in the Sawpit Gully Area north of Egerton has been verified as a mis-identification of the more common orchid *Caladenia paludosa*.

The identification of the "other nine species" is not clear. If these species are those listed in 2.2 then only five of these are priority species and three have been identified at Egerton in the CER and subsequent surveys.

3. Hydrological Issues

3.1 General

Issue 3.1.1

Will "red mud" achieve a 78% reduction in phosphorus output in light of the serious questions raised about similar proposals at Ellenbrook by AGC Woodward-Clyde and the Semeniuk Research Group?

Response 3.1.1

The proponents have committed to prepare a Drainage Management Plan prior to any major works. The Drainage Management Plan will address the issue of water quality arising from urban development. The design of the stormwater control system will comply with criteria set by the Water Authority of Western Australia (WAWA) and the Swan River Trust.

Issue 3.1.2

Why does the discussion concerning surface water flows only address the discharge volumes? This is a very superficial approach.

Response 3.1.2

See Response 3.1.1

Issue 3.1.3

The sizing of detention ponds, their efficiency against very soluble orthophosphate and the maintenance of exchange capacity of the red mud with time, (or its removal), should be determined before development proceeds.

Response 3.1.3

See Response 3.1.1

Issue 3.1.4

The creation of land suitable for housing and the maintenance of existing wetlands are almost mutually exclusive on the sumplands and palusplain which constitute most of the Egerton area.

Response 3.1.4

Similar housing developments on damplands and palusplains have succeeded in the Canning Vale and Jandakot areas. No sumplands are planned for development.

Issue 3.1.5

There are vague statements that some wetlands will be substantially retained, that there will be landscaping, modification of creeks and so on. If wetlands are to be protected, there must be precise details on how this will be achieved. There is no explanation on how the wetland functions are to be retained or how the wetland types are to be replaced. How are the wetlands to be protected?

Response 3.1.5

The commitments given by the proponent in the CER include the preparation of management plans for the POS areas prior to final subdivision approval. These management plans will include details on vegetation protection methods, public access control, public education, fire control and general management. A Drainage Management Plan will also be prepared.

Issue 3.1.6

The planned filling of the palusplain areas for housing does not consider flooding potential or the greenhouse effect which will increase the frequency of storms, floods, etc.

Response 3.1.6

Runoff from the proposed urban development will be managed by both a piped system and an overland flow path for extreme events. The level of protection against urban flooding will be consistent with that in the Perth area. The effect which changes in atmospheric composition may have on rainfall, the so-called Greenhouse Effect, is not known. However, it is an issue affecting the Perth Metropolitan area as a whole, and not just Egerton, and as such should be treated as a matter of general policy by the relevant authorities.

Issue 3.1.7

The Mound Spring is a remarkable wetland, with a very special vegetation community. This area must be fully protected.

Response 3.1.7

The groundwater seepage areas in the north-west corner will be protected in POS.

Issue 3.1.8

Why is the proposal inconsistent with Coalition Government Policy which states that wetlands will no longer be drained and filled?

Response 3.1.8

The draining and filling of wetlands is covered by the Environmental Protection (Swan Coastal Plain) Policy which nominates wetlands to be protected. No wetlands at Egerton are included in this Policy.

Issue 3.1.9

What impact or modification of the existing creek systems and flow regimes is proposed, while fringing vegetation be retained or will the creeks become devegetated and channelised drains.

Response 3.1.9

The biological function of the creek systems will be retained and enhanced as part of the overall strategy for drainage management of the development. Creekline vegetation will be retained wherever possible and rehabilitated where it is currently lacking. New water bodies will have fringing emergent sedge vegetation.

Issue 3.1.10

How many test bores have been sunk to gather information for this review?

Response 3.1.10

A groundwater model has been developed for Egerton which will provide information for the design of the Drainage Management Plan. Existing WAWA bores were used for this design of the model.

Issue 3.1.11

How many bores existed prior to the review being undertaken? Where are they located? What is the quality and quantity of information that has been gathered from these bores over what time frame and how applicable is this information to the following:

- ensuring maintenance of wetlands in present or better condition,
- assessing hydrological function of the land,
- ensuring the continuation of adjacent rural activities,
- ensuring maintenance of vegetation in Whiteman Park and remnant vegetation in surrounding rural areas,
- assessing the impact of urban development (Egerton property) on adjacent wetlands, rural activities and remnant bushland.

Response 3.1.11

The Drainage Management Plan (DMP) being prepared as a commitment by the proponent will address the issues of wetland maintenance, hydrological control, flood protection and nutrient control as a result of development.

Egerton 'downstream' of the Ellenbrook conservation area and across from Whiteman Park and will therefore not affect water levels or vegetation in these areas.

Issue 3.1.12

What will be the impact on water levels and water reserves in the Gngangara Mound created by the Ellenbrook and Egerton urban development due to the amount of water that will be drawn from this resource to supply these suburbs?

Response 3.1.12

The development of Egerton is a small part of the Government's strategy for urban development in the north-east corridor. The Government is committed to providing scheme water for the development from whatever source it deems appropriate. The effect of the development in the north-east corridor on the Gngangara Mound water reserves is a matter for the Government and WAWA.

Issue 3.1.13

The CER touches on the impact of urban development on Ellen Brook, but fails to address the issue of a greatly increased nutrient load. This will also impact on the current problems of nutrient enrichment of the Swan Estuary.

Response 3.1.13

There is no evidence to suggest that the Egerton development will "greatly increase nutrient load" to Ellen Brook. In fact, given known the current nutrient loading added as fertiliser to the irrigated pasture at Egerton, a change to urban development is likely to produce a reduction in nutrient input to the river systems. The drainage management system will also be designed to standards agreed upon by the WAWA and the Swan River Trust.

3.2 Water Resources - Drainage**Issue 3.2.1**

The DMP must comply with WAWA's Arterial Drainage Scheme Plan for the North-East Corridor.

Response 3.2.1

WAWA's Drainage Strategy for the North-East Corridor is currently being revised. The Drainage and Nutrient Management Plan for Egerton is being prepared in consultation with WAWA in order that any revisions to the Authority's Drainage Strategy can be taken account of.

Issue 3.2.2

Due to changes to the Department of Planning & Urban Development's (DPUD) North-East Corridor Structure Plan, WAWA's drainage plan is regarded by WAWA as no longer valid, although the principles are the same. It is therefore premature to expect the public to make assessments on the Egerton CER drainage strategy based on the WAWA report.

Response 3.2.2

See Response 3.2.1.

Issue 3.2.3

A full Drainage Management Plan should be included in the CER for community scrutiny and comment.

Response 3.2.3

The Drainage Management Plan being prepared as a commitment by the proponents will be submitted to the DEP for approval and will be subsequently available for the public scrutiny.

Issue 3.2.4

Drainage should not be directed into existing creeks and wetlands because of the ways these operate. This practice would expose nutrients and pollutants directly to the groundwater. It also gives no opportunity for a secondary line of crisis, i.e. there is no area to make any alterations to take remedial action before the runoff reaches Ellen Brook.

Response 3.2.4

The strategy of the Drainage Management Plan will be to maximise detention time for stormwater and groundwater to enable the majority of nutrients to be stripped out of the water prior to entering the river system.

3.3 Water Resources - Groundwater

Issue 3.3.1

WAWA advises that the subject land is located within the Swan Groundwater Area where there is a need to obtain a licence for the use of groundwater and that continued access to the Leederville aquifer cannot be guaranteed.

Response 3.3.1

The comment is acknowledged.

Issue 3.3.2

WAWA advises that groundwater requirements for the POS and Zoological Gardens should be sourced from the shallow unconfined groundwater source.

Response 3.3.2

Irrigation of POS and the Zoological Gardens will be from the shallow unconfined groundwater. The impact of this abstraction is being included in the groundwater modelling as part of the Drainage and Nutrient Management Plan for Egerton.

Issue 3.3.3

The North-East Corridor Environmental Audit identifies at least three groundwater levels whereas the CER bases all discussion and management plans on a single groundwater level. Clearly more detailed information and study is need before decisions can be made as to drainage strategies necessary for urbanisation of the area.

Response 3.3.3

The design of the drainage management system will be based on a groundwater model produced by experienced hydrogeological consultants.

Issue 3.3.4

Groundwater supplies need to be properly conserved and should be based on the recommendations of the Water Resources Council report to a Parliamentary Select Committee. This report states there should be no further housing developments on either the Gnangara or Jandakot mounds.

Response 3.3.4

Development of the North-East Corridor complies with Government Policy on development in the Perth Metropolitan Area (METROPLAN, Urban Expansion Policy, North-East Corridor Structure Plan).

Issue 3.3.5

There is concern about the continuing fall in levels within both the superficial water tables and the regional water table. Before this development proceeds any further it is necessary to establish the effects of the draw down for Egerton and Ellenbrook developments and the impact on the Perth Water Supply as provided by the Gngangara Mound. It is also necessary to establish the impacts of a lowered regional water table on surrounding land functions, vegetation and land uses.

Response 3.3.5

See Response 3.1.12. The effect of development on groundwater levels will be included in the Drainage Management Plan.

Issue 3.3.6

Even allowing for POS and conservation areas to be seasonally inundated it will be necessary to fill or drain 225ha i.e. almost half the entire area of Egerton development. Very careful borehole monitoring and modelling will be required to prevent damage to wetlands by the proposed drainage. Current low ground water levels resulting from a sequence of dry years must not be taken as an average.

Response 3.3.6

Subsoil drainage will be set at an appropriate level in accordance with WAWA's Drainage Strategy for the North-East Corridor.

3.4 Mound Spring

Issue 3.4.1

The term 'mound spring' has been used because the term has been documented in the EPA's Red Book which describes a site at Muchea (C25) which has specific and unusual vegetation typifying that found at Mound Spring locations. The discovery of a similar site supporting the same species of vegetation at Egerton is indeed an important and significant find. Flora surveys conducted by the Environmental Consultants has failed to identify important flora species existing at the Mound Spring. These species whilst not gazetted rare species are nonetheless rare on the Swan Coastal Plain. The species in question are:

1. *Goebelbryum unguiculatum*
2. *Hyalolepidozia longiscypha*
3. *Lycopodium serpentinum*
4. *Drosera pulchella*.

Response 3.4.1

The groundwater seepage area in the north-west incorrectly termed a 'Mound Spring' will be protected as POS for the main purpose of conservation. Any flora or fauna associated with the wetland area will therefore also be conserved. A management plan for the wetland POS will be prepared prior to subdivision.

Issue 3.4.2

The Mound Spring at Egerton assumes greater importance because the Mound Spring at Muchea has been destroyed.

Response 3.4.2

See Response 3.4.1

Issue 3.4.3

If the Mound Spring area has uncontrolled public access as part of the POS concept then the integrity of the area and the dependant species habitats will be destroyed.

Response 3.4.3

Public access will be controlled by strategic location of dual use paths and walkways/boardwalks.

Issue 3.4.4

The Mound Spring is a remarkable wetland, in pristine condition, with a very special vegetation community. Three species which are considered rare on the Swan Coastal Plain are present. This area must be fully protected.

Response 3.4.4

See Response 3.4.1

3.5 Servicing - Water Supply and Sewerage**Issue 3.5.1**

WAWA advises that proposal will be fully serviced with reticulated water and sewerage facilities to the satisfaction of WAWA at the developers expense.

Response 3.5.1

The urban development proposals for Egerton include the provision of reticulated water supply and sewerage to service all development lots and sites. The reticulation systems will be designed and constructed, by the developer, to meet WAWA's normal standards for such. The cost of the reticulation systems would be a part of the development cost, as is normal for urban development with the Perth Metropolitan Area.

The reticulation systems would link to WAWA's planned headworks systems for water supply and sewerage as outlined in the CER. As is normal for urban development within the Perth Metropolitan Area headworks, such as those proposed to service the North-East Corridor, would be paid for by WAWA with headworks charges levied on all lots created in the proposed development.

Issue 3.5.2

The Summary page (i) and Page 8 within the body of the report refer to the Gngangara Mound being to the east of Egerton. It is in fact to the west.

Response 3.5.2

The sentences meant to indicate that the Lexia borefield was on the east side of the Gnangara Mound.

Issue 3.5.3

The CER does not indicate that on site effluent treatment will be necessary. On site sewage treatment could substantially impact surface water quality and yet the CER does not provide any real discussion on this aspect. Where will the treatment ponds be situated and how and what process will be used? Why has the issue of sewage disposal not been adequately addressed as the development cannot go ahead without this resolution?

Response 3.5.3

It is now unlikely that the on-site treatment of sewage effluent would be utilised for Egerton. On this basis, therefore, sewage disposal would be via WAWA's planned headworks system as outlined in the CER.

In any case any proposal for on-site sewage treatment of sewage effluent would require a separate environmental assessment as outlined in the CER.

Issue 3.5.4

What impact will the proposed sewage treatment facility have on the already high nutrient levels in Ellen Brook?

Response 3.5.4

See Response 3.5.3.

Issue 3.5.5

What impact will the abstraction of water from the Lexia borefield for water supply to Egerton have on the wetlands and natural environment in the area?

Response 3.5.5

The environmental management of extraction of water from the Lexia borefield is the responsibility of WAWA.

4. Social Issues/Public Consultation**Issue 4.1**

The proponents spoke briefly to two people and then tended to dismiss their comments particularly in relation to the Mound Spring.

Response 4.1

The issues raised by the people involved in the public consultation were included in the CER on Page 3 and responses were provided on each specific point. The nature of the 'Mound Spring' was investigated by the Geological Survey Department of WA at the expense of the proponent. The 'spring' was found to be a seepage area for the superficial groundwater rather than an artesian Mound Spring as is the common usage for the terminology.

Issue 4.2

No follow up community consultation took place except for discussions with the Shire of Swan whose vested interests must preclude its comments being accepted as community input.

Response 4.2

The response of the community to the CER (four submissions by the advertised date for closure) indicates that the level of community consultation was adequate and that the majority are not concerned by the proposal.

Issue 4.3

There have been no social impact studies conducted on existing communities and businesses in the vicinity, yet already the proposed impact of transit routes has had a profound effect on residents throughout Swan Shire, and Bassendean Shire, particularly those in Success Hill.

Response 4.3

The impact of proposed transit routes is a regional planning issue for DPUD.

Issue 4.4

Detailed social impact studies should be undertaken over a period of not less than 3 months to determine the full social impacts of the development, particularly in view of the expected increase in traffic movements through the area.

Response 4.4

The public have been involved in an extensive consultation process conducted by Government Agencies regarding the development of this area as a whole. Consultations during this process have resulted in refinement and changes in land uses and road corridor alignments. Although no formal social impact study was carried out specifically for Egerton, the development of this area has been subject to study within the following planning exercises:

1987 - Planning for the Future of the Perth Metropolitan Region (Corridor Review Report); which referred to possible urban development in the subject area.

May 1990 - Draft Urban Expansion Policy Included the area as Category A land suitable for urban development.

November 1990 - Urban Expansion Policy

December 1990 - Metroplan designated the area as a major component of the North-East Corridor Metroplan Development Program.

1991 - The North-East Corridor discussion paper.

1992 - Shire of Swan North-East Corridor Draft Structure Plan.

1992 - Metropolitan Region Scheme Amendment No. 879/33.

SPC Structure Plan discussion paper.

Council Structure Plan

Workshop on road alignments with local land owners.

1994 - Metropolitan Region Scheme Amendment 950/33.

The information which has been prepared within these studies and their consultation exercises, constitutes a valuable resource.

Issue 4.5

The consultants ignored a request arising from the public consultation to consider the findings of the North-East Corridor Environmental Audit by V&C Semeniuk. Why was this study not included as part of the CER?

Response 4.5

The North-East Corridor Environmental and Landscape Audit was not referred to as it is still in draft form and requires further work before it is completed. However, its recommendations have been considered by the Environmental Audit Steering Committee and used as the basis for drafting the North-East Corridor Structure Plan. The Egerton Structure Plan conforms with the North-East Corridor Structure Plan.

Issue 4.6

The consultants failed to include representatives from community groups who offered assistance in field surveys to assist in the identification and location of important vegetation in the Mound Spring area. It was agreed that this was a good idea and that the consultant would get back to the community group to advise.

Response 4.6

The offer of assistance in the field from community groups was appreciated and, although originally considered as a good idea, was eventually not required.

The assistance of the Chief field botanist from CALM was used to locate several plants in the seepage areas in the north-west corner.

Issue 4.7

The fringe dwellers of the Swan Valley, who are the most relevant and well known authorities for the area in regard to cultural impacts on Aboriginal people were not consulted.

Response 4.7

The consultants for the Aboriginal Heritage Survey interviewed 16 Aboriginal informants who have associations with the Upper Swan/Ellen Brook area and took five principal informants on an inspection of the site. The informants included people who have associations with the Swan Valley Region. Requests by the Consultant to consult directly with the Fringe Dwellers of the Swan Valley Inc. were not taken up. NB: The Fringe Dwellers organisation no longer exists as an entity.

Issue 4.8

Many Nyungah Aboriginal people have not been consulted on the rezoning at Egerton. There should be proper consultation with all Nyungah people who respect their traditional beliefs and who have knowledge, links and associations with the area. Consultation should not be through anthropologists.

Response 4.8

See Response 4.7

Issue 4.9

The prevailing winds will blow air pollution over the new development which is of concern due to the increasing rates of asthma in the population. Are asthma rates and health effects of those coming to live at Egerton going to be recorded?

Response 4.9

This matter is relevant to the whole of Perth rather than specific residential areas and is therefore a government matter.

Issue 4.10

The Heritage significance of the area includes the Henry Bull cottage and associated dam and the Ellenbrook bushland both adjacent to the Egerton area. The impact of the development on the heritage significance of the area has not been investigated.

Response 4.10

Henry Bull's cottage, owned and fully restored by the proponent, is outside the area directly affected by the Structure Plan and will not be disturbed. The heritage dam is protected under a legal agreement with the proponent and will also not be adversely affected.

Issue 4.11

On Page 7, it is estimated that traffic originating in Egerton with a destination outside the area will provide approximately 11,000 trips per day! The impact of these 11,000 vehicle movements and their effect on our existing smog, haze, lead and other air pollutants has not been considered in the CER?

Response 4.11

The regional and district road network has been developed to accommodate the traffic generated from Egerton and Ellenbrook without adverse impacts. The district and local traffic and transportation studies completed for both Ellenbrook and Egerton have focussed on all forms of transport including private vehicles, servicing, public transport, cycle and pedestrian needs. At all stages, the road network has been designed to fully accommodate the needs for access on an equitable basis. Thus, the roads surrounding Egerton and Ellenbrook have been fully designed to contain the impacts and forecast traffic volumes.

5. Environmental Implications and Management

Issue 5.1

The proponents should maintain minimum, maximum and optimum water levels and seasonal patterns in wetlands and other conservation areas. They should not drain and/or fill to make areas suitable for development.

Response 5.1

The hydrology of wetlands to be retained will be maintained at pre-development levels. Areas to be filled predominantly include areas already cleared for pastures. Sub-soil drains will be set at an appropriate level in accordance with WAWA's drainage strategy for the North-East Corridor.

Issue 5.2

The CER states that there are species present which are uncommon on the Swan Coastal Plain, such as the Burrowing Frog, Honey Possum, Bandicoot, also that there are Category H wetlands and Priority Listed species, yet it fails to propose that significant areas be properly protected.

Response 5.2

Most of the property is degraded as far as natural vegetation is concerned. The majority of the least disturbed vegetation, along with its fauna and flora, will be protected.

Issue 5.3

Two thirds of the area is waterlogged or seasonally inundated and must be drained or filled or both to make it suitable for urban development and the proponents say it is capable of supporting housing. At what cost to the community in real terms and in adverse effects?

Response 5.3

The cost of filling and draining will be a cost to the developer and not to the community. The effects of environmental changes are described within the CER.

Issue 5.4

The impacts of Egerton on surrounding rural land and activities, especially to the south have not been investigated at all, particularly in relation to changes in groundwater levels. Why have no studies been undertaken to determine the impact of urban development at Egerton on the surrounding rural areas, especially those "down stream" which are the most likely to be affected?

Response 5.4

These issues will be addressed in the Drainage Management Plan but it is very unlikely that there will be any adverse effects on "down stream" properties.

Other effects on surrounding rural land and activities were subject to investigation and consideration during the process of regional planning conducted by Government Agencies which concluded in the zoning of both Ellenbrook and Egerton as urban deferred.

6. Proposed Public Open Space Areas in the Egerton Structure Plan

Issue 6.1

Which areas will remain undisturbed native vegetation within the POS areas and which will be disturbed for recreation development?

undertaking surveys, and documenting these. Where is this work and verification?

Response 7.3

There are no records of DRF at Egerton according to CALM's database. The chief field botanist from CALM has visited the site on two occasions and is well able to make comments on the flora of the site.

Issue 7.4

Insufficient information is provided in the CER for full technical assessment of the nature and extent of changes to both the existing natural and social environments. Much of the environmental impacts and management strategies are not yet discussed and are deferred to consultants reports and studies yet to be completed.

Response 7.4

The CER provides sufficient technical assessment of the issues as required by the EPA's guidelines. The proponent is undertaking ongoing studies and has committed to more detailed studies once the principles outlined in the rezoning document are approved. There is no point in preparing detailed plans unless the broad principles of the CER Structure Plan are accepted.

Issue 7.5

The referencing throughout the document is either incomplete, does not reference at all or provides inaccurate referencing information.

Response 7.5

The comments are noted.

Appendix 3

List of submitters

Government

Department of Conservation and Land Management (Crawley Office)

Water Authority of Western Australia

Private

P G & K L Pearson

Ms A Herlihy

Ms J Zeck

Ms H Turner

Mrs A Hine

Groups/Organisations

Waterbird Conservation Group Inc

Ellenbrook Conservation Group

Swan Waste Action Group

Nyungah Circle of Elders

Conservation Council of WA Inc